

WHAT IS CLAIMED IS:

~~SW/~~ 1. A screen for allowing a light generated by a light source and modulated by a picture display device having pixels laid out to form a matrix to produce an image thereon to be projected by using a projection optical means on said screen as an enlarged picture, said screen comprising:

a Fresnel lens sheet placed on an emission side of said picture display device;

a first configuration element having:

lenticular lenses provided on an incidence side of a light passing through said Fresnel lens sheet; and

light absorbing layers each provided at a place in close proximity to the focal point of one of said lenticular lenses and are separated from each other by a predetermined distance for forming a light passing unit; and

a second configuration element having a light passing plate fixed on said emission side of said first configuration element;

wherein a pitch of said light passing units is made smaller than a pitch of pixels projected and enlarged on said screen from said image produced by said picture display device.

2. A screen according to claim 1 wherein an emission surface of said light passing plate is subjected to a reflection preventing process for preventing reflection of a visible light.

3. A screen according to claim 1 wherein, on an emission

side of said light passing plate, there is provided a reflection preventing film for preventing reflection of a visible light.

4. A screen according to claim 1 wherein a light scattering material is mixed inside said light passing plate.

5 5. A screen according to claim 1 wherein a light scattering layer is provided between said light passing plate and said first configuration element.

6. A screen according to claim 1 wherein:

10 Fresnel lenses of said Fresnel lens sheet are laid out at a pitch  $F_p$ ;

15 said light passing units are laid out in a horizontal direction of said screen at a pitch  $L_p$ ; and

20 a ratio  $L_p / F_p$  of said pitch  $L_p$  to said pitch  $F_p$  is set at a value in the range 1.588 to 1.649.

25 7. A screen for projecting an enlarged picture on said screen from a picture display apparatus including a light source, a picture display device implemented as a matrix of pixels each having a means for modulating the intensity of a light generated by said light source, and a projection optical means for projecting said displayed picture appearing on said picture display device,

said screen comprising:

25 a first configuration element having a plurality of lenticular lenses provided on a light- emission side of said picture display device and light absorbing layers provided on

a light- emission side of said Lenticular lenses, and  
a light passing second configuration element provided on  
said light- emission side of said first configuration element,  
said lenticular lenses having a longitudinal direction  
5 coinciding with a screen surface vertical direction and laid  
out contiguously in a screen surface horizontal direction; and  
said light absorbing layers sandwiched by boundaries of  
any two adjacent openings each provided at a location in close  
proximity to a focal point of one of said lenticular lenses  
10 associated with said opening;

wherein:

said first and second configuration elements are bound or  
stuck to each other;

15 a pitch of said openings is made smaller than a pitch of  
pixels projected and enlarged on said screen from said displayed  
picture output by said picture display device; and

20 a pitch of interference lines caused by both interference  
sources is set at a value about equal to or smaller than said  
pitch of pixels projected and enlarged on said screen from said  
displayed picture output by said picture display device.

8. A screen according to claim 7 wherein an emission  
surface of said second configuration element is subjected to  
a reflection preventing process for preventing reflection of  
a visible light.

25 9. A screen according to claim 7 wherein, on an emission

side of said second configuration element, there is provided a reflection preventing film for preventing reflection of a visible light.

10. A screen according to claim 7 wherein a light scattering material is mixed inside said second configuration element.

11. A screen according to claim 7 wherein a light scattering layer is provided between said second configuration element and said first configuration element.

12. A screen according to claim 7 wherein:  
a third configuration element having Fresnel lenses is provided on a light- incidence side of said first configuration element;

15 said Fresnel lenses of said third configuration element are laid out at a lens pitch  $F_p$ ;

said openings of said first configuration element are laid out in a horizontal direction of said screen at a pitch  $L_p$ ;

a ratio  $L_p / F_p$  of said lens pitch  $L_p$  to said pitch  $F_p$  is set at a value in the range 1.588 to 1.649;

20 a pitch  $M_{pl}$  of moire lines caused by both interference sources is set at a value smaller than a pitch  $I_{ph}$  of pixels projected and enlarged on said screen in a screen horizontal direction from said displayed picture output by said picture display device; and

25 a pitch of interference lines caused by said both

interference sources is set at a value about equal to or smaller than a pitch of pixels projected and enlarged on said screen from said displayed picture output by said picture display device.

5 13. A projection- type picture display apparatus comprising:

a light source;  
a picture display device implemented as a matrix of pixels for modulating the intensity of a light generated by said light source; and

a projection optical means for projecting a picture appearing on said picture display device,

a Fresnel lens sheet placed on an emission side of said picture display device;

a first configuration element having:  
lenticular lenses provided on an incidence side of a light passing through said Fresnel lens sheet; and

light absorbing layers each provided at a place in close proximity to the focal point of one of said lenticular lenses and are separated from each other by a predetermined distance for forming a light passing unit;

a second configuration element having a light passing plate fixed on said emission side of said first configuration element;

25 and

wherein: a pitch of said light passing units is made smaller than a pitch of pixels projected and enlarged on a screen by said picture display device.

14. A projection- type picture display apparatus  
5 according to claim 13 wherein, on an emission side of said light passing plate, there is provided a reflection preventing film for preventing reflection of a visible light.

15. A projection- type picture display apparatus  
10 according to claim 13 wherein a light scattering material is mixed inside said light passing plate.

16. A projection- type picture display apparatus  
according to claim 13 wherein a light scattering layer is provided between said light passing plate and said first configuration element.

17. A projection- type picture display apparatus  
15 according to claim 13 wherein:

Fresnel lenses of said Fresnel lens sheet are laid out at a pitch  $F_p$ ;

20 said light passing units are laid out in a horizontal direction of said screen at a pitch  $L_p$ ; and

a ratio  $L_p / F_p$  of said pitch  $L_p$  to said pitch  $F_p$  is set at a value in the range 1.588 to 1.649.

18. A projection- type picture display apparatus comprising:

25 a light source;

a picture display device implemented as a matrix of pixels each having a means for modulating the intensity of a light generated by said light source;

5 a projection optical means for projecting a displayed image appearing on said picture display device; and

a screen used by said projection optical means to project said displayed image as an enlarge picture and provided with:

10 a first configuration element having a plurality of lenticular lenses provided on a light- emission side of said picture display device and light absorbing layers provided on a light- emission side of said lenticular lenses, and

15 a light passing second configuration element provided on said light- emission side of said first configuration element,

20 said lenticular lenses having a longitudinal direction coinciding with a screen surface vertical direction and laid out contiguously in a screen surface horizontal direction;

25 said light absorbing layers sandwiched by boundaries of any two adjacent openings each provided at a location in close proximity to a focal point of one of said lenticular lenses associated with said opening; and

said first and second configuration elements are bound or stuck to each other,

wherein:

25 a pitch of said openings is made smaller than a pitch of

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pixels projected and enlarged on said screen from said displayed image output by said picture display device; and

a pitch of interference lines caused by both interference sources\_is set at a value about equal to or smaller than said pitch of pixels projected and enlarged on said screen from said displayed image output by said picture display device.

19. A projection- type picture display apparatus according to claim 18 wherein an emission surface of said second configuration element is subjected to a reflection preventing process for preventing reflection of a visible light.

20. A projection- type picture display apparatus according to claim 18 wherein a light scattering material is mixed inside said second configuration element.

21. A projection- type picture display apparatus according to claim 18 wherein a light scattering layer is provided between said second configuration element and said first configuration element.

22. A projection- type picture display apparatus according to claim 18 wherein:

a third configuration element having Fresnel lenses is provided on a light- incidence side of said first configuration element;

said Fresnel lenses of said third configuration element are laid out at a lens pitch  $F_p$ ;

said openings of said first configuration element are laid

out in a horizontal direction of said screen at a pitch  $L_p$ ;

a ratio  $L_p / F_p$  of said lens pitch  $L_p$  to said pitch  $F_p$  is set at a value in the range 1.588 to 1.649;

5 a pitch  $M_{p1}$  of moire lines caused by both interference sources is set at a value smaller than a pitch  $I_{ph}$  of pixels projected and enlarged on said screen in a screen horizontal direction from said displayed image output by said picture display device; and

10 a pitch of interference lines caused by said both interference sources is set at a value about equal to or smaller than a pitch of pixels projected and enlarged on said screen from said displayed picture output by said picture display device.

15 23. A screen comprising:

a Fresnel lens sheet;

20 a first configuration element having:

lenticular lenses provided on an incidence side of a light passing through said Fresnel lens sheet; and

25 light absorbing layers each provided at a place in close proximity to the focal point of one of said lenticular lenses and are separated from each other by a predetermined distance for forming a light passing unit; and

a second configuration element having a light passing plate fixed on said emission side of said first configuration

25 element;

wherein a pitch of said light passing units is made smaller than a pitch of pixels projected and enlarged on said screen from said image produced by said picture display device.

24. A screen for projecting an enlarged picture on said screen from a picture display apparatus comprising:

5 a first configuration element having a plurality of lenticular lenses provided on a light- emission side of said picture display device and light absorbing layers provided on a light- emission side of said Lenticular lenses, and

10 a light passing second configuration element provided on said light- emission side of said first configuration element,

15 said lenticular lenses having a longitudinal direction coinciding with a screen surface vertical direction and laid out contiguously in a screen surface horizontal direction; and

20 said light absorbing layers sandwiched by boundaries of any two adjacent openings each provided at a location in close proximity to a focal point of one of said lenticular lenses associated with said opening;

wherein:

25 said first and second configuration elements are bound or stuck to each other;

a pitch of said openings is made smaller than a pitch of pixels projected and enlarged on said screen from said displayed picture output by said picture display device; and

25 a pitch of interference lines caused by both interference

sources is set at a value about equal to or smaller than said pitch of pixels projected and enlarged on said screen from said displayed picture output by said picture display device.

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